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ABSTRACT

To determine the efficacy of instructional television for adults in GED (General Educational Development) programs in large urban areas, a study was conducted using Kentucky Education Television's (KET) newly marketed GED preparation series (which was instituted with the help of the Chicago Public Library and local colleges). The study was guided by three main purposes: To assess the effectiveness of a design for fitting televised instruction (ITV) into a larger instructional network, to compare the GED performance of adults who were prepared by this TV course with a comparable sample of GED testees who prepared for the test in some other way, and to assess students' perceptions of TV instruction in general and of this television series (KET/GED) in particular. This report includes a complete description of study procedures, results, and conclusions. Overall conclusions note the following: (1) Remedial education via ITV is an attractive format for urban audiences when such instruction is offered at no cost to the student. (2) Forty percent of the audience tested stated that they would not have been able to prepare for the GED test in other ways, indicating that ITV does reach in part a new audience which would not access conventional instructional programs. (3) Major motivational factors included convenience of the weekend broadcast, preference for TV instruction, confinement to the home, and a perceived compactness of the course. (SH)

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An Evaluation of the Effectiveness of Instructional Television for GED Preparation*

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OVERVIEW OF THE PROBLEM AND REVIEW OF THE LITERATURE

With the increasing sophistication of technology in recent years, many new and varied ways of providing educational opportunities tc adults have been designed. These open learning systems hold the promise of serving millions of adults whose busy and complicated life styles do not permit them to adapt to classroom-bound methods of instruction. A major component in many open learning systems is television. In educational settings television may be used to teach a mass audience at least as effectively and much more efficiently than classroom-bound methods. In addition, televised instruction can reach heretofore neglected populations of adults who may wish to continue their education, but who, in the past, have been frustrated by conventional instructional design.

There are several comprehensive reviews which deal with the philosophical bases for and the administration and organization of the use of television in the context of open learning (Mackenzie, 1975; Brown, 1975). Research on the use of televised instruction has tended to focus on post-secondary education. Very few systematic studies have dealt with the use of televised instruction to provide basic education to adults. In the more specific area of preparing people to take the GED test, even fewer studies have been found. This study is intended to be relevant especially to this last area of research.

Since the 1950's a great deal of research has examined the effectiveness of television as a method of instruction. Most of this research has addressed itself to the question of whether television teaches as effectively as face-to-face classroom instruction. Among the first studies which compared television to other methods of instruction were those performed by Erickson and Chausow in the 1950's (Erickson and Chausow, 1960). These studies, which examined the relative

effectiveness of offering college courses via open circuit television, concluded that no significant differences were found when instructional television was compared to face-to-face live instruction. Since that time major reviews of hundreds of comparative effectiveness studies have reached the same conclusion (Campeau, 1974; Chu and Schramm, 1967). A second major conclusion of these reviews is that research should be designed to identify ways of fitting televised instruction into a more complete conceptualization of the teaching-learning situation.

Most of the studies summarized in the reviews mentioned above had been performed with adults who had already received a high school education. There have been many fewer studies on the use of television to provide basic education to adults. In a 1974 review, Niemi and Anderson identified 30 basic education programs in North America which have used television as a component of the instructional design (Niemi and Anderson, 1974). The majority of these studies have focused on students' subjective impressions of the televised instruction. Students generally report that they enjoy this type of instruction. Four comparative effectiveness studies concluded that there was no significant difference between the outcomes of televised instruction and other methods of instruction. Of there 30 programs, 6 were designed to prepare people to take the GED test. As in the previous studies, students' perceptions of the televised instruction were favorable. At the end of their review, Niemi and Anderson concluded that

> . . . adult educators have tended to rely on subjective impressions for assessing the appropriateness of their programs for the culturally different poverty groups and the educationally disadvantaged. If the desired changes in behavior are to be accomplished, systematic schemes for evaluating programs should be devised. . . (Niemi and Anderson, 1974:77).

Since Niemi's review, Eyster has carried out a research project to examine the effectiveness of televised GED instruction (KET/GED series) in preparing people to take the GED test (Eyster, 1975). Eyster compared the GED performance

of people who had no systematic preparation, people who prepared via classroom instruction and people who prepared via televised instruction which was supplemented by various support components and found no significant differences. In a separate paper, Eyster stated that his findings were consistent with the conclusion reached by other researchers that televised instruction should be complemented by a variety of differentiated support systems in order to be effective (Eyster, 1976).

From this review two major conclusions may be drawn. First, there is little systematic research which deals with the use of televised instruction in the field of adult basic education. In the more specific area of GED preparation, only one study has been found which deals with questions other than students' perceptions of televised instruction. Second, most suggestions for further research agree that research must be designed to identify effective strategies for fitting televised instruction into the larger framework of open learning.

Background of the Study

In 1976, Kentucky Education Television, through the Cambridge Book Company, marketed a new GED preparation series which utilized a "Sesame Street for Adults" format. This series consisted of 34, one-half hour programs in either a commercial two inch quad format or on 3/4 inch video cassette.

The City Colleges of Chicago, which has the major responsibility of providing remedial education for adults in Chicago, elected to utilize this series via open air transmission. The City Colleges had had 20 years of experience in Instructional Television (ITV), both in producing and delivering college credit courses through TV College (Zigerell, 1973). In 1973, a non-traditional Library-College program had been developed, whereby the City Colleges and the Chicago Public Library provided the software previously utilized in ITV in a video

cassette format for independent study. This program, Study Unlimited, offered remedial GED preparation programs as well as college credit study (Cunningham and Reilly, 1975).

These two formats were brought together in a program called GED-TV. That is to say that the college arranged with the local PBS station to air the Kentucky series. The City Colleges of Chicago provided the software, instructors, and administered the program; the 80 branches of the Chicago Public Library and its 400 professional librarians, provided the place for registration, pre/post testing, and laboratory support services with group meetings and print resources. The Cook County Superintendent's Office arranged for special testing of the students who prepared by GED-TV immediately following the series.

There was little information to guide the program administrators in how to provide instructional support services for ITV aimed at remedial adult education. Accordingly, the instructional strategies were devised on the basis of the TV College experience with college level courses and the Study Unlimited experience with independent study. The support system included: one teacher-counselor assigned to every 50 students enrolled; the distribution of Study Guides (3) and an Illinois constitution packet through the local branch library; the administration of the Cervero Placement-Prediction Test at enrollment and when the third Study Guide was distributed; the provision of a library card as well as a specialized high interest-low reading level collection at the library; the telecasts on video cassettes for review or making up missed lessons at 6 library and 6 college locations; and a 24 hour "hot line" to facilitate communication through the network.

Students who enrolled were placed into four groups in respect to their performance on the initial reading test. These quartiles were based on the prediction

estimates of passing the GED exam. Regardless of reading level, students were allowed to enroll. Students in the lowest quartile, however, were to be encouraged to also attend conventional classroom instruction.

Over 6,000 calls were logged on the "hot line" during the two week pre-registration and the first six weeks of registration. Within Chicago, the City Colleges enrolled 3,255 students. Another 680 adults were referred to 10 other cooperating community colleges outside Chicago but within the viewing range of the telecast. Another thousand students were referred to alternate methods of instruction within the City Colleges since they inquired too late to be enrolled in the ITV program.

In order to be more rational in the development of further programs, a research design was developed to give feedback on the efficacy of ITV for the remedial education of adults in a large urban area. This paper reports the result of these efforts.

DESIGN OF THE STUDY

Introduction

This study was guided by three main purposes, each of which had its own research design. The first purpose was to assess the effectiveness of a design for fitting televised instruction into a larger instructional network. Most of the data collected were related to this purpose. Three forms of data were used to make this assessment: students' achievement; students' retention in the course and their use of the components of the instructional network; and the effect of their differential use of the instructional network on achievement. The second purpose was to compare the GED performance of adults who were prepared by this TV course with a comparable sample of GED testees who prepared for the test in some other way. The third purpose was to assess students' perceptions of TV instruction in general and of this television series (KET/GED) in particular.

Use and Effectiveness of the Instructional Network

As mentioned above, three forms of data were used for this part of the study, and the procedures used to collect these data are presented below.

The two measures of achievement used were GED performance and change in reading scores. Four hundred sixty-eight people, 14 per cent of the number of initial course registrants or 23 per cent of those completing the course, completed all five sub-tests of the GED during the two weeks following the end of the course. Although there may have been others who took the GED test after these two weeks, it was not possible within the limits of this study to identify these people. A GED prediction instrument, the Cervero Test, developed according to the Cloze procedure, was used to measure students' change in reading scores. Cloze tests measure reading comprehension (Bormouth, 1969), and the Cervero test has been shown to be an accurate predictor of GED performance (Cervero, 1977). Five hundred eighty-three students took the Cervero test both upon registration for the course and after the Reading and English lessons had been broadcast. These 583 students were generally unrepresentative of the original population of 3,255 course registrants since there initial reading scores tended to be higher.

In order to measure the retention of students in the program and their use of the components of the instructional network, a Utilization Questionnaire was designed. The Questionnaire was completed by students during the two weeks following the end of the course. All those who took the GED test were requested to complete the Utilization Questionnaire at the time that they took the GED test. Four hundred and thirty-two people, 91 per cent of those who completed the GED, also completed the Questionnaire. A five per cent random sample, 127 people, of those who did not register for the GED also completed the Questionnaire. In order to characterize the population's response to the Questionnaire, the sample

values were projected using the following procedure. The responses of the GED sample were projected to the 630 people who registered for the GED test, while the non-GED sample's responses were projected to the 2625 people from which the sample was drawn. These two projected values were summed to obtain estimated values for the population.

An assessment of the effectiveness of differential use of the instructional network on achievement was also performed. An analysis was made of the relationship betwen the responses of the 432 people to the Utilization Questionnaire and their performance on the GED test. An analysis was also made between the responses of the 200 people who completed the Utilization Questionnaire and their change in reading scores. The effect of student characteristics on GED performance on change in reading scores was also analyzed. Students' demographic characteristics were obtained upon the registration for the course. Students' socioeconomic status (SES) was measured by using the Duncan Scale of Occupational Prestige (Reiss, 1961) to quantify the status of their current occupation. This information was obtained at the time that students completed the second Cervero test.

Comparative Effectiveness of TV Instruction

For this part of the study, the GED performance of those who were prepared by the TV course was compared to the population of GED test takers in Chicago. The population of the TV course was 468 people who completed all five sub-tests during the two weeks following the end of the course. The control group consisted of 212 people who were randomly selected from the files of the GED testing office in Cook County.

A comparison was also made of the response to the GED-TV series among the ten cooperating colleges which also registered students for the series.

Student Perceptions of TV Instruction

A Student Survey was administered to an 8 per cent random sample of the first 1947 course registrants. This sample of 156 students was representative of the population from which it was drawn. The Survey was designed to assess students' perceptions of TV instruction in general and the television series used in this course, KET/GED, in particular. In addition, the Survey included items designed to assess several student characteristics.

RESULTS AND DISCUSSION

Introduction

Before presenting results related to the three purposes of the study, some characteristics of the student population will be described. There were 3255 people who registered for the television course. Their demographic characteristics were: average age, 31 years; average years of school completed, 9.7; 70 per cent women; 70 per cent Black, 19 per cent White, 7 per cent Spanish American, and 4 per cent "other" races. Since there were no entry requirements for the course, an appreciable number of registrants had reading levels which are typical of those found in ABE or pre-GED classes.

Based on responses to the Student Survey, it was estimated that 12 per cent of the population had previously taken the GED test, 3 per cent had previously taken a TV course, 40 per cent would not have been able to study for the GED test if the TV course had not been offered, and 51 per cent had not had a Chicago Public Library card before registering for the course.

Use and Effectiveness of the Instructional Network

Three forms of data were used to make an assessment of the effectivenss of a design for fitting televised instruction into a larger instructional network.

The results will be presented in three sections: students' achievements, students' retention in the course and their use of the components of the instructional network, and the effect of their differential use of the instructional network on achievement.

Student Achievement.--Of the population of 3255 students: 630, 19 per cent, registered to take the GED test during the two weeks following the end of the course; 468, 14 per cent, completed the five sub-tests of the GED; and 209, 6.4 per cent, passed the total GED test. Of the 468 people who completed the GED test, 209, 44.7 per cent, passed and 259 students, 55.3 per cent, failed. Those who failed the test either did not receive a total score of 225 or received a score of less than 35 on a sub-test. Table 1 shows the number and percent of people who received a score below the minimum passing score of 35, between 35 and 44, and at or above 45 for each sub-test. In addition, the mean scores for the sub-tests and for the total GED test are given.

TABLE 1

NUMBER AND PERCENT OF PEOPLE IN SELECTED SCORE RANGES FOR THE GED SUB-TESTS AND THEIR MEAN TEST SCORES

GED Test		Below 35		35-44		45 & Above		Mean Test Score
	N	N	%	N	%	N	%	
Grammar	480	51	10.6	229	47.7	200	41.7	43.7
Social Studies	481	21	4.4	161	33.5	299	62.1	46.9
Natural Science	474	36	7.6	170	35.9	268	56.5	45.6
Literary Materials	472	19	4.0	154	32.6	299	63.3	47.2
Mathematics	468	100	21.4	269	57.5	99	21.2	38.8
Total	468							222.2

These data indicate that this population preparing with the KET/GED series did better in the three Reading sub-tests than in the Mathematics and Grammar sub-tests.

Table 2 shows the change in Cervero test scores for people divided into quartiles by their initial score. A change of one point on the Cervero test represented a 4.2 point change in the GED total score.

This entire group significantly increased their ability to perform on the GED test. If the sub-groups are examined, it may be concluded that there was an inverse relationship between the amount of gain achieved during the course and initial reading level. The sub-group which had the highest reading level showed no significant change.

Retention and Use of the Instructional Network.--An estimate was made of the retention of the population in the TV course based on the fact that students' picked up the third Study Guide. Of the 3255 course registrants: 62 per cent participated for the duration of the course, 27 per cent discontinued participation sometime during the course and 11 per cent did not start the course. The reasons for non-participation ranged from a lack of time to one woman whose television set had broken before she could view any lessons. Ninety per cent of those people who did not complete the course dropped out before one-third of the lessons had been broadcast.

To what extent did the students utilize the instructional network? Each component of the network will be looked at separately to determine to what extent this population utilized it in preparing for the GED.

Viewing of telecasts.--If those who did not view any lessons are omitted from the population, the remaining people viewed an average of 10.4 lessons (56%) of the total 18 lessons. The lessons may have been missed before a student registered for the course or at any point after registration during the

TABLE 2

DISTRIBUTION OF STUDENTS BY QUARTILES BASED ON ENTRY READING SCORES AND CHANGES IN READING SCORES AFTER 12 WEEKS

Quartiles	Cervero Test Scores	Students on Entry		Number of Students Taking Pre and Post	Mean Pre Test Score	Mean Post Test Score	Change	Signif	Predicted GED Test Score Change
		N=	%=						
Low	0-11	432	14	47	8.74	11.48	+2.74	.0001	11.51
Moderately Low	12-16	790	25	122	14.21	16.73	+2.52	.0001	10.58
Moderately High	17-22	1147	36	206	19.40	20.85	+1.46	.0001	6.09
High	23-50	776	25	208	25.90	25.39	-0.51	.0680	---
Total		3147	100	583	19.78	20.86	+1.08	.0001	4.54

Quartiles were determined in the following way:

Quartiles	Percent Chance of Passing GED
Low (0-11)	0-15
Moderately Low (12-16)	20-43
Moderately High (17-22)	50-80
High (23-50)	84-100

It should be noted that reading scores of the students taking both pre- and post-test were on the average higher than the total population.

eighteen weeks that the lessons were broadcast. It was estimated that of the lessons which people did not view, 27 per cent were missed because people registered after the program had begun. The lessons were available to be viewed for one week following their TV broadcast at 12 sites throughout the city; 8 per cent of the population viewed at least one lesson at these sites. Those students who eventually registered for the GED watched more telecasts ($\bar{x}$=14) than students who did not register for the examination. However, the number of telecasts viewed did not distinguish between those students failing and those passing the test. It would appear then that students who anticipated taking the examination tended to be more regular in their telecast viewing but that this behavior was not a significant factor in predicting performance on the test.

Utilization of teacher-counselor.--Beside television instruction, the other major aspect of the instructional network was the teacher-counselor (TC), who was the hub of the support network. TC's were to have contacted their students by telephone on at least a bi-weekly basis if the student did not come to the weekly tutorial sessions held at 32 library locations. Table 3 shows an estimate of the amount of contact which students had with TC's in this program.

TABLE 3

AMOUNT OF CONTACT BETWEEN STUDENTS AND TC'S

Amount of Contact	Type of Contact			
	Library		Telephone	
	N	%	N	%
None	1826	56.1	1198	36.8
Once	387	11.9	456	14.0
2-6 times	670	20.6	1231	37.8
Every 2 weeks	92	2.8	167	5.2
Once a week	280	8.6	203	6.2
Total	3255	100.0	3255	100.0

Forty-four per cent of the 3255 students enrolling attended at least one fact-to-face tutorial group session with their TC; 11 per cent could be characterized as seeking regular assistance either bi-weekly or every week. Contact with the teacher by telephone could be initiated by either TC or the student. Eleven per cent of the students indicated regular communication by phone with their teacher once a week or every two weeks which suggests instructional assistance. Fourteen per cent indicated only one phone contact with the TC and again one can infer that these calls were probably teacher initiated to find out the status of the student progress. Teachers were required to contact students bi-weekly if the student did not come to the group tutorial sessions. At the time of locating a student by phone, some students were found to have already dropped out of the program or, stated that they could not or preferred not to attend group tutorial sessions. It can be inferred then that students having one or two contacts by phone with their TC were among such students or that TC's were

not able or did not successfully keep in regular contact with those students. The interpretation of the data regarding no telephone contact with the TC (37%) may be a function of either regular contact with the student in the tutorial sessions or inability or lack of sustained effort of the TC in contacting the student. The data show that most students (21% attending tutorial session; 38% having telephone contact) used these strategies moderately during the 18 weeks, i.e. 2 to 6 times. The fact that the telephone contacts which were instructional in nature and those which were teacher initiated to "check up" on the student are not differentiated is a limitation of the data.

Use of print materials.--The Kentucky series has three Study Guides in which the student has practice exercises prior to viewing, as well as during the telecast exercises. Table 4 indicates how students reported utilizing these exercises.

TABLE 4

STUDENTS' USE OF THE STUDY GUIDES PRACTICE EXERCISES

Frequency of Preparation	Time of Use			
	Before Viewing Lessons		While Viewing Lessons	
	N	%	N	%
Always	1254	38.5	2618	80.4
Sometimes	1490	45.8	421	12.9
Never	511	15.7	216	6.7
Total	3255	100.0	3255	100.0

These data are based on student reports and appear to be somewhat exaggerated. However, allowing for the fact that students may have exaggerated their utilization of the Study Guides, clearly these materials were a significant part of the instructional system. Students were required to return twice to the library in which they registered to pick up these guides. Since 62 per cent of those who actually started the course, returned to the library twice to receive the additional material, one can infer that the Study Guides were not only perceived as being important to the telecasts but also that this type of distribution encouraged retention in the program.

No measure was available of the utilization of the librarians and the use of special collections of reading materials by the student. This serious limitation of these data should not cloud the fact that the potential for contact with the professional librarians in the local branch library has potential as a major means of providing support to the student. On registration, 51 per cent of the students had never had a library card. However, 18 per cent of the 3255 students reported circulating books from the library, a somewhat surprising figure since this population is not characterized as library users.

Use of other strategies.--The TC's were encouraged to give Iowa Test of Educational Development tests to students who anticipated registering for the GED and 553 (17%) did take at least one test. Another 25 per cent reported assistance in course preparation from someone other than the TC; for most people, this additional assistance was provided by a family member.

The "hot line" turned out to be a major factor in communication. The "hot line" at the beginning of the series was utilized to refer students to enrollment sites; during the series the "hot line" was utilized by librarians, TC's, and students to establish communication, report problems, or in a few instances

to receive instructional assistance. The "hot line" in the first seven weeks logged 4286 calls; after registration the average number of calls per week was approximately 300.

No data were collected on attendance at conventional classes to which students in the lowest quartile were referred.

Summary.--In summary, then, this population utilized the various strategies as follows:

1. Viewing of telecasts - average number 10 of 18 for entire population; 14 of 18 for those registering for the exam directly following the series.
2. Use of video cassettes - of the 3255 enrollees, 260 (8%) went to one of 12 centers to review or make up a telecast.
3. Teacher-Counselor tutoring - over 1400 (44%) visited a group tutoring session at least once; 11 per cent regularly sought help weekly or bi-weekly.
4. Teacher-Counselor by telephone - Eleven per cent received tutorial assistance on a weekly or bi-weekly basis; in all other cases tutorial assistance sought by students can not be distinguished from TC initiated calls to students to ascertain student status.

5. Librarian contact - The 400 professional librarians saw 62 per cent of the students on three occasions but their activity outside of registering, testing and distributing print materials to the student, was not documented. Fifty-one per cent of the students received a library card for the first time and 18 per cent (586 individuals) circulated library books.

6. Study Guide use - Sixty-two per cent of the enrollees picked up all three Study Guides and the Illinois Constitution packet. Thirty-eight per cent reported regular previewing preparation and 80 per cent reported regular use of materials during the telecast.

7. Other utilization - Seventeen per cent of the students took at least one Iowa test, extensive use was made of the "hot line," and one-fourth of the students received assistance in their study by someone other than the TC.

Effect of Differential Use of the Instructional Network on Achievement.--The final set of data used to assess the effectiveness of the program design was the effect of students' differential use of components of the instructional network on GED performance and change in reading scores. In addition, the effect

of student demographic characteristics on achievements were analyzed. In these analyses, GED test scores and change in reading scores were the dependent variables and students' characteristics and their use of the instructional network were the independent variables. Where the values of the independent variables were categorical the analyses of variance technique was used and where the values of the independent variables were continuous, correlational techniques were used to analyze the data.

The following student characteristics and their differential use of the components of the instructional network were not significantly related to their performance on the GED. Statistical significance was set at the .05 level.

1. Sex
2. Age
3. SES
4. Number of years of school completed
5. Number of lessons viewed
6. Time of registration
7. Amount of contact with a teacher
8. Supplemental viewing of the TV lessons
9. Use of the Study Guides
10. Test-taking preparation
11. Assistance from someone other than a teacher

Two student characteristics, reading scores and race, were significantly related to their performance on the GED test. In order to determine whether initial reading level and race had independent effects on GED performance, a multivariate analysis of covariance was performed. In this analyses, initial Cervero test score was treated as a covariate and scores on the five GED sub-tests were used as the dependent variables. In a separate procedure, an analysis of covariance was performed using the total GED score as the dependent variable.

The first effect examined was the extent to which there is an interaction between initial Cervero test score and race. The results showed that there was no interaction between these two variables ($F=.58$; $df=15,1147$; $P<.89$). The meaning of this result is that the relationship between initial reading score and GED performance is the same within the categories of race used in this study.

The next step was to perform the regression part of the analysis of covariance using initial Cervero test score as the predictor variable. The multivariate relationship between the Cervero test and the five GED sub-tests was significant ($F=71$; $df=5418$; $P<.0001$). The results are presented in Table 5.

TABLE 5

RELATIONSHIP BETWEEN INITIAL CERVERO TEST SCORE AND THE GED SUB-TESTS

GED Sub-Test	Percent of Variance Explained	Multiple R	F	P Less Than	Step Down F	P Less Than
Grammar	37	.61	252	.0001	252	.0001
Social Studies	28	.53	162	.0001	21	.0001
Natural Science	34	.58	218	.0001	19	.0001
Literary Materials	27	.60	244	.0001	20	.0001
Mathematics	11	.32	51	.0001	2	.1856

The final step in the analysis of covariance analyzed the effect of race on GED performance holding constant the effect of reading score. The multivariate relationship between race and the five GED sub-tests was significant ($F=5.2$; $df=15, 1154$; $P<.0001$), showing that race has an effect on GED performance, independent of initial reading ability level as measured by a paper and pencil test. The results of this analysis are shown in Table 6.

TABLE 6

EFFECT OF RACE ON GED SUB-TESTS HOLDING CONSTANT CERVERO TEST SCORE

GED Sub-Test	Hypothesis Mean Square	Univariate F	P Less Than	Step-Down Mean Square	Step Down F	P Less Than
Grammar	430	13	.0001	430	13	.0001
Social Studies	289	9	.0001	57	2	.08
Natural Science	354	11	.0001	36	2	.10
Literary Materials	182	6	.0006	6	1	.81
Mathematics	705	21	.0001	217	9	.0001

After holding constant initial reading level, race has a significant impact on the scores of the five GED sub-tests.

An analysis of covariance using the total GED test score as the dependent variable was also performed. The results followed the pattern which appears in the sub-test analysis. The results showed no interaction between initial Cervero test score and race ($F=.95$; $df=9411$; $P=.99$). The correlation between the Cervero test and the total GED test, .37, was significant. Holding constant the effect of reading score, the relationship between race and the total GED test was significant ($F=3.78$; $df=3428$; $P<.01$).

Although these results show that initial reading ability and race have independent effects on GED performance, they do not show the direction of the effects. Table 7 shows the direction of the effects by presenting the number and per cent passing the GED test for each race within each reading score group. Since the direction of the results are the same in all five sub-tests and the total test, only the results for the total test are presented and discussed.

TABLE 7

NUMBER AND PERCENT PASSING THE GED TEST BY RACE BY QUARTILES

Cloze Group	Race														
	Black			Spanish			White			Other			Total		
	N	%	Total	N	%	Total	N	%	Total	N	%	Total	N	%	Total
11 and below	0	0	22	0	0	2	0	0	3	1	12.5	8	1	2.9	35
12 to 16	8	15.4	52	2	40.0	5	5	41.7	12	1	7.7	13	16	19.5	82
17 to 22	29	25.9	112	3	42.9	7	18	66.7	27	9	64.3	14	59	37.4	160
23 and above	48	65.8	73	2	100.0	2	58	87.9	58	12	63.2	19	113	74.4	152
Total	85	32.8	259	7	43.7	16	74	74.0	100	23	42.6	54	189	44.0	429

The Spanish and the "Other" groups are too small from which to make any reliable generalizations. However, if the GED performance of the White and Black races are compared, the direction of the effect is evident. Excluding the lowest quartile in which no one passed the GED, Blacks in each quartile had a lower percentage passing than Whites at the next lowest level. This indicates that although Blacks may enter a program with the same ability level as Whites, they do less well than Whites on the GED test. It was concluded that students' reading ability and race have significant and independent effects on GED performance. That group of students who passed the GED had a higher initial reading level and were more likely to be White than those who failed.

For the second measure of achievement, gain in reading score, neither differential use of any one component of the instructional network, nor any student characteristic had any significant effect. Statistical significance was set at the .05 level. There was no significant relationship between reading gains and any of the following variables.

1. Sex
2. Age
3. SES
4. Number of years of school completed
5. Race
6. Number of lessons viewed
7. Time of registration
8. Amount of contact with a teacher
9. Supplemental viewing and the TV lessons
10. Use of the Study Guides
11. Test taking preparation
12. Assistance from someone other than a teacher

Comparative Effectiveness of Television Instruction

The GED scores of those who prepared by televised instruction were compared to a sample from the population of GED testees in Chicago. Table 8 presents these results.

TABLE 8

COMPARISON OF MEAN GED TEST SCORES FOR THE TELEVISION--
PREPARED AND CONTROL GROUPS

GED Test	Mean Scores		Difference	Significance
	TV	Control		
Grammar	43.74	42.24	+1.50	.018
Social Studies	46.94	47.39	- .45	.451
Natural Science	45.64	46.37	- .73	.248
Literacy Materials	47.16	47.86	- .70	.228
Mathematics	38.77	40.16	-1.39	.014
Total	222.25	224.02	-1.77	.872

The group that prepared by television performed significantly higher on the Grammar sub-test, while the control group of people who prepared by other methods performed significantly higher on the Mathematics sub-test. The differences in the scores on the three reading sub-tests and the total GED test scores were statistically insignificant.

Assessment of Students' Perceptions of Televised Instruction

Students' perceptions of the KET/GED instructional units, TV lessons and Study Guides, were generally favorable, as was their rating of the television course in general. These results are given in Table 9.

TABLE 9

STUDENTS' PERCEPTIONS OF TELEVISED INSTRUCTION

Rating of Course		Rating of Lessons		Rating of Study Guide	
Rating	%	Rating	%	Rating	%
Very dull	1	Very Difficult	3	Confusing	2
Dull	1	Difficult	21	Not Helpful	2
Alright	18	Just Right	54	Alright	16
Interesting 3	38	Easy	19	Helpful	46
Very Interesting	42	Very Easy	3	Very Helpful	34
Total	100		100		100

Students were also asked why they chose television preparation for the GED test. While most people were aware of other ways to prepare for the GED test, they chose TV because it was more convenient than classroom-bound courses or because they simply could not prepare in any other way. The results are shown in Table 10.

TABLE 10

REASONS FOR CHOOSING A TV COURSE TO PREPARE FOR THE GED TEST

Reasons	Percent
Time of lessons is convenient	35
Prefer television to a regular class	20
Cannot get out of the home	17
Takes less time than a regular class	17
Unaware of other ways to prepare	4
Don't want family and friends to know that I don't have a high school diploma	4

Students time preference for the broadcast of the lessons was also assessed. There was not any one time period which was favored by a majority of the student. Weekday and weekend mornings and weekend afternoons were the most popular. In general, evenings were not a preferred time as seen in Table 11.

TABLE 11

TIME PREFERENCE FOR THE BROADCAST OF THE LESSONS

	Number	Percent
Weekday morning	42	27.8
Weekend afternoon	37	24.5
Weekend morning	32	21.2
Weekday evening	21	13.9
Weekday afternoon	13	8.6
Weekend evening	6	4.0

CONCLUSIONS

These conclusions are limited to 1) large urban populations, 2) utilization of the KET series, and 3) by the fact that 38 per cent of the students were registered after the first two telecasts had been aired. Within these limitations the following conclusions can be drawn.

Remedial education via ITV is an attractive format for urban audiences when such instruction is offered at no cost to the student.[1] A large proportion of this audience (40%) stated they would not have been able to prepare for the GED test in other ways, indicating that TV does reach in part a new audience which would not access conventional instructional programs. Major motivational factors included convenience of the weekend broadcast (35%), preference for TV instruction (20%), confinement to the home (17%) and a perceived compactness of the course (17%). These data suggest that the students enrolled had heavy responsibilities and that airing of TV programs, to be effective, should be on weekday mornings or on the weekend. Two telecasts a week would be preferable since 28 per cent of the students did indicate a preference for weekday morning viewing.

The KET program received good ratings from the students: 80 per cent rated the telecasts as well as the Study Guides as interesting or very interesting. About half the students (54%) reported the level of instruction as "just right" and about an equal number rated the series as difficult (24%) or easy (22%). There are no data on other GED video programs with which to compare these results utilizing the Kentucky series. However, on the basis of this population, it can be concluded that the "Sesame Street for Adults: approach is attractive to urban adults

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[1] Of the ten colleges participating in the program, only those colleges offering the program at no tuition cost and distributing free Study Guides, registered large numbers of students.

in remedial education and that the level of instruction of the KET series as reported by students is appropriate.

The dropout rate of students in GED-TV was surprisingly low. Dropout rates in large urban programs in Chicago have been reported as high as 67 per cent in a time span of 26 weeks (Cunningham, 1973). Eleven percent of the students who enrolled never began the course, which compares to a reported estimate of 10 per cent of "no-shows" of pre-registered students in the City Colleges of Chicago's classroom. Of those students who began the course, 73 per cent were active in the sixth week and 69 per cent completed the course. Thus it can be concluded that students who persist through one third of the KET series will probably complete the course, and furthermore that the TV format appears to encourage student retention.

In this population, the Kentucky series was shown to be effective in raising reading levels among students who scored in the lowest three quartiles or with a prediction of less than 84 per cent of passing the GED test on entry into the program. This increase in ability to read was significant at the .001 level and was inversely related to entry reading level scores. For example, students in the lowest two quartiles raised their predicted total GED score by approximately 11 points after 12 weeks of instruction while students in the third quartile (moderately high) increased their predicted score by 6 points.

For those students who took the GED examination immediately following the course, no significant differences were found between the passing rate of students preparing via the televised Kentucky series and a comparable population who prepared for the test in some other way. In both cases the passing rate was approximately 44 per cent or a mean score of 222. Twenty-three per cent of the students completing the course completed all five sub-tests of the GED examination.

It is concluded therefore that instructions by television may be a more cost effective method of GED instruction, if the problem of getting the students with a good chance of passing the GED to the test is solved.

Only tentative conclusions can be drawn regarding the effectiveness of the instructional network provided for the students. Clearly a small proportion (11%) sought regular weekly or bi-weekly assistance from the TC in person-to-person tutorial sessions and a similar proportion received regular assistance by telephone. The provision of TC tutorial assistance in face-to-face interaction was utilized at least once by 44 per cent of the group with one-third of the students reporting attendance at 2 to 6 meetings. This behavior is significantly different than the experience of college level students enrolled in TV college and seems to indicate that a substantial number of adults in remedial education do desire and need face-to-face assistance.

Use of Study Guides appeared to be characteristic of the entire group during the telecast and about 38 per cent of the group prior to the telecast. Despite late entry of over one-third of the students, an average of ten programs were viewed by the total population. Less use was made of auxillary viewing by video cassette (8%), use of library materials (17%), and practicing for the GED test using Iowa tests (16%). A number of librarians were observed as being very active in assisting students but no overall assessment of the contribution of librarians is available. Although strategies to assist them in their preparation, a most surprising finding was that utilization of these strategies were not found to differentiate students who passed the GED from those who registered but were not successful in passing the test. Only two variables, race and initial reading scores had significant effects on performance on the GED and neither of these variables can be manipulated.

It was demonstrated that persistence in the course was positively related to reading level entry scores. Sixty per cent of those students originally enrolling had above a 50 per cent chance of passing the GED test on entry. Seventy-five per cent of students in the fourth quartile who did take the test passed. If a program could get all of those students in this quartile who enrolled to persist and to take the test and if these students did as well as their reading cohort who took the test, there would have been 582 students passing the GED test rather than 209. It can therefore be concluded that any support system devised for ITV for GED students pay as much, if not more, attention to getting the student registered for the test as to providing additional direct instruction.

Race and initial reading scores were significant and independent predictors of whether a student who registered for the test passed or failed the examination. It is concluded that non-white students should be provided additional support in test taking procedures and in practice sessions in preparation for the examination. Open enrollment, regardless on initial reading score, is a debatable issue. However, if students with low reading scores are allowed to enroll and are encouraged to take the GED examination, there should be some allowance in the program to interpret possible failure in the examination for students who enter with low reading scores.

LIMITATIONS OF THE STUDY

In order to place the results of this study into propoer perspective, the major methodological weaknesses are listed below.

1. The responses to the Utilization Questionnaire may not be an accurate reflection of the extent to which the population used the components of the instructional network. First, since students' responses were given during the two weeks

following the end of the course, these responses should be considered as indirect evidence of what actually occured. Although there is no reason to believe that students purposefully misstated their responses, they were asked to recall events which may have occured several months before completion of the Questionnaire. Second, the population values were obtained from the projection of the responses of a sample. Due to the size of the sample which was chosen for the GED non-registrants, there will naturally be some amount of discrepency between the sample's responses and the responses which would have been given by the population.

2. No detailed description was obtained of the conditions under which students recieved the televised instruction, or of the type or quality of teacher instruction which students received. Thus, the results obtained with respect to the effectiveness of instruction should be interpreted with caution.

3. The GED scores were obtained only for students who took the GED test during the two weeks following the end of the course. Therefore, the long term effects of the course were not investigated.

4. For the following reasons, the gain in reading scores exhibited by students may not be an accurate indication of the change which occured in the population. First, it has been noted that the use of gain scores to measure change may be an inaccurate measure of "true change" (Cronbach and Furby, 1970). Second, the high rate of attrition of students taking the second cloze test introduces an unknown bias into the results. For instance, it is possible that there was a greater tendency to take the second cloze test for people who actually increased their reading scores than for those who did not increase their reading scores.

SUGGESTIONS FOR FURTHER RESEARCH

The following should be among the more fruitful areas of future research with respect to the use of televised instruction for GED preparation.

1. There should be analyses of which learner characteristics (e.g., learning style, ability) when matched with which program design components (e.g., spacing oftelevised lessons, elements of a support system) produces the most learning for the most people. This learning should be measured by GED performance and, for those people who no not take the GED, by a comparable test (e.g., Iowa Test of Educational Development).
2. Studies which pit televised instruction against other types of instruction as means of GED preparation will continue to provide ambiguous information unless an effort is made to define more explicitly the program design elements and the learner characteristics in the instructional systems being compared.
3. Finally, attention should be devoted to the replication of studies in order to confirm results of a particular study, or to determine whether those findings were the result of undefined variables which characterized the original study.

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